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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)
)
Preparation for International) IC Docket No. 94-31
Telecommunication Union)
World Radiocommunication) DOCKET FILE COPY ORIGINAL
Conferences)

REPLY COMMENTS OF MOTOROLA, INC.

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REPLY COMMENTS OF MOTOROLA, INC.

Motorola, Inc. ("Motorola") hereby offers its reply to the comments filed in response to the Commission's Second Notice of Inquiry ("Second NOI") released January 31, 1995 in the above-captioned proceeding.

I. INTRODUCTION AND SUMMARY

In these reply comments, Motorola addresses only some of issues which it addressed in its initial comments. Nonetheless, it continues to urge the Commission to support as U.S. proposals all of the positions outlined in those comments. On the satellite side, Motorola feels particularly compelled to respond to those commenters who opposed the designation of the 19.2-19.7/29.0-29.5 GHz bands for use by non-GSO MSS feeder link networks. Having already licensed several non-GSO MSS feeder link systems, the U.S. government's first priority at WRC-95 should be to ensure that

these systems can be successfully implemented on a timely basis. In this regard, if WARC-92 was the "make-or-break" conference for "Big LEO" service links, WRC-95 is equally important from a feeder link standpoint.

Timely and successful implementation of U.S. Big LEO systems will also hinge on the difficult task of coordinating these service and feeder links around the world. Thus, changes to non-GSO MSS coordination procedures will be a key issue at WRC-95.

In a similar vein, it is critical that the 1610-1626.5 MHz band be made more useable by modifying certain regulatory footnotes applicable to this band.

In addition, given the long lead time required for the U.S. to develop rules for use of new MSS spectrum, to assign it to individual licensees, and to construct licensed satellite systems, it is not too early to seek additional spectrum at WRC-95 to meet the needs of future generations of MSS systems.¹

With respect to terrestrial mobile issues, Motorola continues to maintain that the U.S. should not seek allocations for "Little LEOs" in bands that are heavily used by terrestrial private land mobile systems, such as the 157-174 and 450-512 MHz bands.

¹ With respect to the issue of new MSS spectrum allocations, Motorola agrees with the views contained in the Reply Comments of Iridium, Inc. being filed on this date.

Indeed, the U.S. should propose that the agenda for WRC-97 include consideration of additional allocations for these services, particularly in connection with public safety requirements.

Finally, Motorola strongly urges the U.S. government to adopt proposals that are, to the maximum extent possible, consistent with the positions set forth in the Final Report of the Conference Preparatory Meeting. The positions set forth in that Report have been accepted by the international community, in many cases only as a result of long and hard negotiations led by the U.S. delegation. The job of the U.S. delegation at WRC-95 will be far easier, and, more importantly, the prospects of a successful outcome from a U.S. standpoint will be far greater, if the U.S. positions do not deviate significantly from those agreed to at the CPM.

II. SATELLITE ISSUES

A. No Information Has Been Presented In the Comments Which Should Dissuade the U.S. From Going Forward with a Proposal to Designate the 19.2-19.7/29.0-29.5 GHz Bands for Use by Non-GSO MSS Feeder Links

As the Commission recognizes in the Second NOI, "[o]btaining sufficient NGSO feeder link spectrum for 1.6/2.4 GHz 'Big LEO' MSS networks is critical for the introduction of those networks in the

U.S. and globally." To this end, Motorola endorsed in its initial comments the second of two options identified by ITU-R Task Group 4/5 for accommodating non-GSO MSS feeder links in bands above 17.7 GHz. Under this option, a footnote would be added to certain sub-bands identified for use by non-GSO MSS feeder link networks pursuant to which: (1) RR 2613 would not apply; (2) existing GSO FSS networks would have equal status; and (3) future GSO FSS systems would have to protect notified non-GSO MSS feeder links. In the Second NOI, the Commission identifies 19.2-19.7 and 29.0-29.5 GHz as appropriate sub-bands to which such a regulatory footnote could apply. Motorola wishes to emphasize that this approach is favored by the international community as evidenced by the fact that the Final Conference Preparatory Meeting Report to WRC-95 ("CPM Final Report") recommends this as the preferred option for satisfying Ka-band non-GSO MSS feeder link requirements.²

In their comments, a number of GSO FSS interests argue that non-GSO MSS systems should not be using Ka-band spectrum for their feeder links because sufficient spectrum is available below 17.7 GHz.³ If a portion of the Ka-band must be used for non-GSO MSS

² CPM Final Report at 157.

³ See Comments of Hughes Space and Communications Company ("Hughes") at 5

feeder links, then several of these commenters contend that: (1) the amount of spectrum made available should be less than the 500 MHz in each direction proposed by the Commission;⁴ (2) non-GSO MSS operators must agree to accept certain operating constraints that would purportedly enable them to share the band on a co-frequency basis with GSO FSS systems⁵; and (3) Ka-band feeder links must remain subject to RR 2613.⁶ For the reasons set forth below, each of these arguments should be rejected.

First, neither Hughes nor GE Americom provide any information to support their claims that there is sufficient spectrum below 17.7 GHz to accommodate non-GSO MSS feeder links.⁷ To the contrary, those non-GSO MSS systems seeking feeder link spectrum below 17.7 GHz have had an extremely difficult time in that endeavor. In fact, given those difficulties, the Commission has indicated that all non-

and GE Americom at 5.

⁴ See Comments of Hughes at 6, GE Americom at 2-3, and Comsat World Systems Division ("Comsat WSD") at 7-8.

⁵ See Comments of Hughes at 6-9.

⁶ See also Comments of Hughes at 10-14, GE Americom at 2.

⁷ Hughes asserts that GSOs can use the Ka-band more efficiently than non-GSOs because of their ability to reuse a given band segment through 2° orbital spacing. Comments of Hughes at 6. Motorola believes that the beamwidths employed by a Spaceway-type VSAT system are too wide to allow this degree of reuse and, therefore, would result in interference to adjacent satellites. In addition, and more importantly, even if Hughes could reuse spectrum with 2° orbital spacing, then it should be able to satisfy its asserted need for 1000 MHz for the Spaceway system in North America through 2° spacing of its two proposed North American satellites. This would enable Hughes to reuse the 500 MHz at 29.5-30.0 GHz, which, according to Hughes, is the portion of the Ka-band most "uniquely suited to support ultra-small earth terminals." Comments of Hughes at 15.

GSO MSS licensees may have to use the Ka-band to satisfy their feeder link requirements.⁸

Second, the fact that multiple non-GSO MSS systems may have to use Ka-band to satisfy their feeder link requirements is one of the reasons why 500 MHz in each direction must be made available for non-GSO MSS feeder links.⁹ This includes not only presently licensed or proposed non-GSO MSS systems, but also future non-GSO MSS systems both in the U.S. and abroad. As recognized in the Interim Report of the IAC, sharing studies to date are inconclusive with respect to whether more than two non-GSO MSS feeder link networks can operate on a co-frequency basis. In this regard, it must be borne in mind that, apart from the potential for having multiple non-GSO MSS feeder link networks at Ka-band, there will be numerous GSO FSS and Fixed Service networks in the 19.2-19.7/29.0-29.5 GHz bands with which coordination will be necessary. Some amount of otherwise available non-GSO MSS feeder link spectrum will inevitably be lost in this process.

⁸ See Second Notice of Proposed Rulemaking, CC Docket No. 92-297, FCC 94-12 (rel. Feb. 11, 1994) at para. 22; Notice of Proposed Rulemaking, CC Docket No. 92-166, FCC 94-11 (rel. Feb. 18, 1994); Report and Order, CC Docket No. 92-166, FCC 94-261 (rel. Oct. 14, 1994), at para. 169.

⁹ GE Americom claims that non-GSO MSS feeder link spectrum requirements in bands above 16 GHz can be reduced by 50% by employing dual polarization. Comments of GE Americom at note 2. As noted in CPM Report to WRC-95, however, use of dual polarization is not likely to be feasible in the 16-30 GHz range. CPM Final Report at 41.

Third, as for sharing between non-GSO MSS feeder link and GSO FSS networks, Hughes bases its claim that such sharing is feasible on the conclusions of TG 4/5 and on additional sharing studies that Hughes has sponsored in recent months.¹⁰ However, as Hughes recognizes, TG 4/5 concluded that sharing is feasible only if certain operational constraints are imposed on non-GSO MSS feeder link networks. Hughes asserts that these operational constraints "would have little or no impact on Iridium and TRW and would maintain the required system availabilities."¹¹ This is simply not true. As explained in the attached document entitled "Review of CPM95 Sharing Studies between 20/30 GHz GSO/FSS networks and NGSO Feeder Links for MSS Operating in the 1-3 GHz Spectrum" (Attachment 1 hereto), the type of operational constraints or mitigation techniques that have been identified by Hughes and others either would not work or cannot practically be implemented. For example, in order for certain proposed mitigation techniques to work, such as satellite diversity, Motorola would not be able to locate any earth stations below a certain latitude which, in turn,

¹⁰ Comments of Hughes at 6-10. It should be noted that another GSO interest, GE Americom, maintains that such sharing is not feasible. See Comments of GE Americom at 3,5.

¹¹ Comments of Hughes at 8.

would mean that it could not locate an earth station anywhere in the United States!

Further, Hughes' own sharing studies actually demonstrate the reverse of what they are intended to show, that is, they demonstrate that sharing is not feasible because the studies themselves are predicated upon the implementation of certain interference mitigation techniques by the non-GSO MSS operator.¹² Again, as explained in Attachment 1, the use of these techniques would not allow the IRIDIUM system to meet its service objectives.

Motorola also wishes to emphasize that a fundamental concern it has with a codirectional sharing approach is the uncertainty and attendant risk posed by unbounded sharing with GSO FSS systems. As the number of GSO FSS systems in the subject bands increase, there is a very real risk that feeder link operations, which, in the case of the IRIDIUM System, require very high levels of reliability, will be subject to interference. Even if, in theory, a non-GSO MSS operator had first-in-time interference rights (assuming RR 2613 did not apply), the burden of coordinating with numerous VSAT systems would be enormous and, as a practical matter, perpetual. Moreover, the ability of a non-GSO MSS operator to detect the exact

¹² GE Americom concedes that sharing between non-GSO MSS feeder links and GSOs is not feasible. Comments of GE Americom at 3,5.

source of interference from among multiple VSAT networks and to enforce its interference rights would be questionable at best. A commercially viable, multi-billion dollar global non-GSO MSS system simply cannot take this risk or accept such on-going regulatory uncertainty.

Finally, Motorola disagrees with Hughes' contention that RR 2613 must be maintained in all FSS bands. Hughes' contention is based on the arguments that the policy behind this provision is still relevant (i.e., the need to give GSO satellite services absolute protection while allowing non-GSO satellite systems to use FSS bands only to the extent that they do not interfere with GSO

satellite systems) and that otherwise non-GSO satellite systems will have no incentive to avoid interfering with GSOs.¹³

To the contrary, the policy behind RR 2613 has outlived its usefulness as satellite technology has evolved and non-GSO satellite systems, particularly global systems, become more prevalent. Hughes offers no sound public policy reasons why GSOs should continue to be given primacy in all FSS bands. Further, Motorola is not arguing that existing GSO networks should not be protected and have priority over new non-GSO systems. Existing GSOs should be protected not because they are GSOs, but because they are already operational and have international status at the ITU. As for the Hughes contention that there should be an incentive for non-GSOs to avoid interference to GSOs, there is simply no basis for maintaining a system where all the burdens of sharing fall on non-GSOs. Non-GSO protection of GSOs should be based not on a one-sided set of incentives, but on rights determined by the ITU coordination process. As the Commission correctly recognizes in the Second NOI, RR 2613 "appears to place the burden of interference avoidance primarily on the NGSO MSS network, even where the interference is the result of a later-established GSO FSS system."¹⁴

¹³ Comments of Hughes at 10-11.

¹⁴ Second NOI at 19. See also Comments of Teledesic at 8.

B. The Commission Must Not Allow Teledesic to Undermine U.S. Proposals to Accommodate the Feeder Link Requirements of Non-GSO MSS Systems in the 1-3 GHz Range at WRC-95 and Should Instead Propose that the Agenda for WRC-97 Address Non-GSO FSS Use of FSS Allocations Between 17.7 and 59 GHz

Teledesic argues that WRC-97 will be too late to establish a primary allocation of spectrum for non-GSO satellite networks in order to accommodate both its needs and non-GSO MSS feeder link needs.¹⁵ As TRW notes, however, Teledesic has attempted to recast its service link proposals as non-GSO feeder links in order to have its non-GSO FSS proposal considered at WRC-95. Any concession to Teledesic in the U.S. WRC-95 proposals could jeopardize new allocations for true non-GSO MSS feeder link systems.¹⁶ Motorola agrees with TRW for the same reasons set forth in its initial comments.¹⁷

Issues pertaining to non-GSO FSS allocations for service links should instead be considered at WRC-97. Motorola believes, however, that the agenda item covering this issue should be broader than the one proposed by Teledesic which would limit WRC-97's consideration of this issue to the Ka-band.¹⁸ In Motorola's view, this

¹⁵ Comments of Teledesic at 19-20.

¹⁶ Comments of TRW at 13, n. 23.

¹⁷ Comments of Motorola at 14.

¹⁸ Comments of Teledesic at 20-21.

agenda item should cover any FSS allocations between 17.7 and 59 GHz . Given the number of satellite and terrestrial interests currently vying for Ka-band spectrum and the present uncertainty as to how those issues will be resolved, it would be short-sighted to limit the scope of any WRC-97 agenda item dealing with non-GSO FSS systems to the Ka-band only. By broadening the agenda item to include any FSS allocations above 17.7 GHz, the U.S. and other administrations would have greater flexibility in accommodating the needs of non-GSO FSS systems. Indeed, as lower bands allocated to the FSS become increasingly congested, FSS allocations in the 37.5-59 GHz range will be the next available bands for the implementation of such systems.

C. U.S. Proposals Should Include Changes to Improve Regulatory Provisions and Coordination Procedures Applicable to Non-GSO MSS Systems in the 1-3 GHz Range

1. Regulatory Provisions

RR 731E. In its initial comments, Motorola supported the Commission's proposal to change RR 731E in the ITU Radio Regulations to make it clear that the EIRP power density values presented therein are "mean" values. In this connection, Motorola notes that the CPM Final Report (at 18) proposes to modify RR 731E

to make it clear that the value -3dB(W/4kHz) in RR 731E is a mean, not a peak, value. The CPM Final Report recommendation on this subject is acceptable to Motorola.

So far as Motorola can see, there is no technical justification for the "peak" to "mean" ratio that Loral/Qualcomm Partnership, L.P. ("LQP") proposes in its comments (at 8) and LQP offers none.

In connection with establishing a definition of "mean," Motorola notes that the WRC-97 agenda proposes to address ITU Recommendation 66 which recommends that the definition of "mean" should be studied. Since this is a complex issue as to which there has been little thought given, it should be considered at WRC-97, not WRC-95.

RR 733E. Constellation proposes in its comments (at 5) to delete RR 733, a global footnote which permits AMSS(R) services in the 1610-1626.5 MHz band. Motorola opposes this proposal because deleting AMSS(R) removes flexibility at a time when new systems need to be able to explore the widest possible range of service opportunities.

2. Coordination Procedures

Resolution 46. From discussions at the recently concluded CPM, it now appears that it may not be possible to review and adopt the VGE simplified regulations during the Conference. In that event,

the VGE simplified regulations would not take effect until after WRC-97. To protect against this contingency, there needs to be an agreed-upon methodology during the interim period for coordinating MSS systems. To this end, a modified Resolution 46 should continue to exist as a stand-alone document until the VGE simplified regulations are adopted.

A number of changes need to be made to Resolution 46 in order to facilitate the process of coordinating MSS systems with each other and with other services with which they share spectrum. In its initial comments, Motorola supported most of the changes to Resolution 46 that the Commission identified in paragraph 41 of the Second NOI, and suggested some changes to the VGE simplified regulations as well.

One of the Commission's proposals was to modify Resolution 46 to provide a specific method to calculate coordination regions pursuant to paragraphs 2.1 and 2.2 of the Resolution (Second NOI, at para. 41). Motorola supports this position and believes that procedures utilizing the methodology described in Recommendation ITU-R M [Doc. 8/45]¹⁹ for determining "affected" systems with

¹⁹ "Calculation of the affected region for a mobile satellite service (MSS) network subject to Resolution 46 where coordination is to be effected between space station assignments and co-frequency MSS, fixed service (FS) and mobile service (MS) ground-based stations of other administration," Recommendation ITU-R M [Doc. 8/45].

which MSS systems must coordinate, should be attached to Resolution 46 as an annex to achieve this objective.

Loral/Qualcomm Partnership ("LQP") seems to believe that providing a specific method to calculate coordination regions somehow "confers additional status" on the secondary space-to-Earth MSS allocations in the band 1613.8-1626.5 MHz (LQP Comments, at 26 et seq.). This is not the case. The methodology in Document SG8/45 for determining "affected regions" for coordination purposes would reduce the number of co-frequency assignments with which coordination is necessary. It is a mathematically unassailable method of calculating the area covered by an MSS satellite's field of view when it is in its active service arc, within which other systems may be affected. It is a statement of fact.

The U.S. proposal to WRC '95 should follow the CPM Final Report and propose that procedures utilizing Document SG8/45 be added to Resolution 46 either as an annex or by reference to a recommendation. In that connection, the U.S. should support having Study Group 8 adopt Document SG8/45 at its next meeting in June 1995.

Motorola supports another change the Commission proposed, to replace Section 2.5 of Resolution 46 (coordination with terrestrial

systems). Motorola notes in this connection that the CPM Final Report (at Section 1.4.6.4 (b), p.27) supports this position and identifies the relevant Study Group 2 recommendations. Motorola believes the text of these recommendations should be incorporated either by reference or as annexes to Resolution 46.

Motorola also supports the Commission's proposal that new information be required in Appendix 3 filings. However, in addition to the items identified by LQP in its comments on this issue, one other item of information should be required -- the number of co-frequency CDMA signals in each beam. For the purposes of determining whether a system exceeds the threshold value of RR 2566, the maximum number of users per frequency per beam should be provided in the Appendix 3 data because this is the proper representation of the potential for interference to terrestrial based systems. In addition, it should be noted that multiple satellites covering the same point on the ground should not exceed this limit at that point; if they do, an aggregate value should be required here.

In its initial comments, Motorola recommended that Resolution 46 be modified to state that administrations must respond to a Radiocommunication Bureau publication of notice of a new MSS satellite system within six months or be deemed to have "consented by default" to the proposal. Motorola notes that CPM Final Report (at

Section 4.2.6.3 (e) of attachment 1 to Chapter 4, at 167) proposes language to this effect. The U.S. should support the CPM proposal in this regard.

Motorola also proposed in its initial comments that provision S9.30 of Part B of the VGE Report be modified to permit requests for coordination to be sent to the Radiocommunication Bureau. The CPM Final Report (at 102) proposes to modify S9.30 to achieve that purpose. The U.S. should support this change.

Finally, although there was opposition expressed at the CPM to the concept of incorporating technical standards into the Radio Regulations, Motorola continues to believe that the concept of "incorporation by reference" is a valid proposal which would simplify the radio regulations.

III. TERRESTRIAL MOBILE ISSUES

In its initial comments, Motorola noted that terrestrial land mobile services were facing spectrum shortages. The comments noted the potential for increased occupancy of the bands 150-174 MHz and 450-512 MHz, resulting not only from the growth of existing systems but also from planned new communications services now beginning to be required by private land mobile radio service (PLMRS) users. Motorola reviewed the current utilization of the band and recommended that the U.S. ensure that future WRCs have taken the necessary steps to enable additional spectrum to be allocated to terrestrial land mobile services, particularly PLMRS, before the end of the decade.

Motorola's comments also discussed that portion of the Second NOI that requested comments on providing follow-on spectrum for NVNG-MSS (Little LEOs) below 1 GHz. The Commission noted that the Interim Report of the Industry Advisory Committee identified several categories of candidate bands for additional allocations; included among the "Priority Two" bands were the 152-157 MHz and

450-512 MHz portions of the PLMRS spectrum.²⁰ Motorola strongly opposed any U.S. position that would support sharing in those bands, either domestically or globally via WRC action.

Several Little LEOs seek additional spectrum below 1 GHz.²¹ A few commenters, particularly those in the "second round" of NVNG-MSS applicants, actually identify specific PLMRS spectrum to share and propose preliminary sharing techniques.²² Some also recommend additional allocations in the 380-400 MHz band, which is now used by governmental and military systems.²³

Less than three years ago, the Commission concluded that "without significant regulatory changes in the bands below 512 MHz, the quality of PLMRS communications will likely deteriorate to the point of endangering public safety and the national economy."²⁴ Even taking into account techniques and policies that may increase the potential for utilization, such as widespread PLMRS "refarming", existing PLMRS spectrum will remain congested for years to come. As such, PLMRS bands present particularly poor candidates for sharing with NVNG-MSS. Indeed, the shortages facing the private

²⁰ See Second NOI at 31.

²¹ See Comments of Starsys Global Positioning at 8-9; Comments of E-Sat at 2-5 ; Comments of Orbcomm at 3-8.

²² Comments of LEO One USA at 8-12; Comments of GE American Communications at 11-12.

²³ See, e.g., Comments of LEO One USA at 10.

land mobile services are so acute that additional spectrum is needed, particularly if users are to implement systems employing faster data and imaging while providing operational efficiencies and numerous other benefits.

A. The United States Should Not Seek MSS Below 1 GHz Allocations in Bands Allocated in the U.S. for Terrestrial Private Land Mobile Services

Motorola does not dispute U.S. policy to obtain additional spectrum for NVNG-MSS below 1 GHz as soon as practical, preferably at WRC-95. However, as reflected in the opening round of this docket and amplified below, the PLMRS bands at 150 MHz and 450 MHz are poor sharing candidates for several reasons. At the very least, therefore, it would be premature to identify any such band within the WRC NOI process before completion of rigorous sharing studies.

Initially, the record reflects the fact that these bands are exceptionally crowded - over 12 million licensed transmitters in the spectrum. This makes the 150 and 450 MHz PLMRS bands among the most saturated of any spectrum regulated by the FCC.²⁴ This alone would make sharing with a satellite service extraordinarily difficult, if not totally impossible. Perhaps for this reason,

²⁴ Replacement of Part 90 by Part 88, 7 F.C.C. Rcd 8105 (1992).

²⁵ Notice of Inquiry, 6 F.C.C. Rcd 4126, 4127 (1991). See Comments of APCO at

Orbcomm's comments -- based on that company's "very extensive" analysis of frequencies below 1 GHz -- concluded that "there was not then, and still is not now, any large bands of unused spectrum below 1 GHz."²⁶ Orbcomm itself therefore concluded that the government bands that were identified as "Priority One" frequencies made far better sharing candidates than did PLMRS spectrum.²⁷

Second, the manner in which terrestrial land mobile systems use the band would make sharing with a satellite service nearly impossible. Contrary to the claims of some Little LEO advocates, PLMRS use of this spectrum is not intermittent.²⁸ Indeed, not only are these channels virtually fully occupied now, but the increased use of data communications and trunking will move PLMRS further from the conventional "push to talk" environment the NVNG-MSS proponents seem to assume.²⁹ Moreover, the Commission is now engaged in plans to reform this spectrum, thus seeking to increase further opportunities for additional PLMRS transmitters in the relevant bands.³⁰ Of course, this will correspondingly diminish

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²⁶ Comments of Orbcomm at 7.

²⁷ Id.

²⁸ Comments of LEO One USA at 9; Comments of GE American at 10. See Comments of Motorola at 18; Comments of AAR at 5.

²⁹ See Comments of AAR at 5.

³⁰ Replacement of Part 90 by Part 88, 7 F.C.C. Rcd 8105 (1992).

opportunities for sharing with other services.³¹ In addition, LEO One USA has misconstrued the band plan in PLMRS, and -- contrary to its suggestion -- the interstitial area between adjacent PLMRS channels cannot easily be reused by NVNG-MSS systems.³²

Third, at least some Little LEOs are now planning to use the spectrum in a fashion inconsistent with their own sharing plans. In this proceeding, it has been suggested that short "bursty" transmissions can fit in terrestrial land mobile spectrum during the time between channel release by one user and channel seizure by another or as a spread spectrum transmission overlaid on several terrestrial mobile channels.³³ Yet at IWG-2, NVNG-MSS proponents have admitted that future operations of Little LEOs will not be limited to brief message duration, low duty cycle and low data rate transmissions:

[S]ubscribers will inevitably demand increased functionality from MSS service providers operating below 1 GHz. This means capability for longer

31 See Comments of Motorola at 16; Comments of UTC at 7.

32 LEO One USA mistakenly assumes that PLMRS transmission use 25 kHz channel spacing, leaving broad interstitial areas for other transmissions. Comments of LEO One USA at 9. In fact, before the spectrum refarming now underway, most PLMRS systems in the 450 MHz range are interleaved and use 25 kHz channelization with 12.5 kHz channel spacing. PLMRS services, therefore, are already efficiently reusing the spectrum LEO One USA seeks, making further sharing quite difficult. After refarming, of course, the spectrum will become even more intensely used.

33 See Comments of LEO One USA at 9; Comments of GE American Communications at 10.

messages, value added information services and other telecommunications services. The existing allocations are unable to support transmission of longer messages, data/information files, facsimile and similar services. Thus, *future spectrum allocations should more realistically provide for expansion of services that MSS systems can offer in these bands.*³⁴

Of course, no one has even tried to argue that high data rate services can share with terrestrial land mobile services. Thus, NVNG-MSS proponents' interest in PLMRS bands is, at best, inconsistent with their own plans.

Overall, it appears that fundamental realities about terrestrial land mobile systems, an accurate knowledge of their own plans, and a realistic outlook on sharing techniques are not well understood by the Little LEO community. This could account for some of the unwarranted optimism about sharing. In fact, the record in this proceeding does not support identification of specific target bands below 1 GHz as appropriate for follow-on NVNG-MSS allocations. Indeed, the sole preliminary sharing studies concluded to date, presented at the Toronto meeting of 8/3 last year, were pessimistic: "high density land mobile applications will make the relevant bands difficult to share between land mobile services and the MSS."³⁵

³⁴ IWG-2 Interim Report at 8-9 (emphasis added).

³⁵ ITU-R SG 8/3, Doc. 8-3/18 at 13 (July 27, 1994).